

the nature of the soil. The formation consists of a reddish argillaceous earth, generally containing irregular concretions of a pale brown, indurated marl. This stone, where most compact, is traversed by small linear cavities, and in several respects resembles the less pure fresh-water limestones of Europe. The concretions not unfrequently become so numerous, that they unite and form a continuous stratum, or even the entire mass.

At Bajada de St<sup>a</sup>. Fé, in the Province of Entre Rios, beds of sand, limestone, and clay of different qualities, containing sharks' teeth and sea-shells, underlie the Pampas deposit. The shells, although numerous, are few in kind. Mr. George B. Sowerby informs me that they appear to belong to one of the less ancient tertiary epochs; they consist of *Venus* nov. spec. near to *V. cancellata*; *Arca* nov. spec. near to *A. antiquata*; a very large oyster, probably an extinct species; an imperfect specimen of a second species of oyster near to *O. edulis*; and a *Pecten* near to *P. opercularis*. These beds pass upwards into an indurated marl, and this again into the red argillaceous earth of the Pampas, containing the remains of those extinct quadrupeds, which every where characterize that deposit. To the southward of the Plata level plains of an uniform composition, interrupted only at wide intervals by hills of crystalline rock, extend to a distance of about three hundred miles; and to the northward for at least an equal space, and probably much further. As might have been expected from the perfectly level surface, wherever a continuous section is presented on the banks of the great rivers, very slight changes of colour show, that the deposit has been accumulated in strata as horizontal as the land, or as the water-line at the base of the cliffs.

In the province of Banda Oriental (to the N. and N. E. of the Plata), and in part of that of Entre Rios, the land, though very low and level, has a foundation of granitic and other primary rocks. These older formations are partially covered, in most parts, by a reddish earthy mass containing a few small calcareous concretions; while in other parts, they are concealed by more regular strata, of indurated marl passing into limestone, of conglomerates, and ferruginous sandstone. The entire formation probably belongs to the same epoch with that of the Pampas deposit. In the earthy mass, even where it is of little thickness, and where it might readily be mistaken for detritus produced from the underlying granites, remains of large quadrupeds have several times been discovered.

On the shores of the Plata and in the neighbouring districts, proofs of a change of level having taken place between the land and the water within a recent period, may be observed. Both near Monte Video and Colonia del Sacramento, beds of shells are lying on the beach at the height of several feet above the present tidal action. Near Maldonado I saw estuary shells of recent species embedded in clay, and raised above the level of a neighbouring fresh-water lake.

On the banks of the Parana, a shell identical with, or most closely resembling an estuary species (*Potamomya labiata*, now living in that part of the Plata, where the water is brackish) is accumulated in great masses, which are found some miles inland, and are elevated several yards above the level of the river. Sir Woodbine Parish, also, has in his possession, shells procured from an extensive formation near Ensenada de Barragan (south of Buenos Ayres), which is quarried for lime. Mr. George Sowerby has examined these fossils, and says the following are identical with living kinds; *Voluta colocynthis*, Dillwyn: *V. angulata*, Swainson: *Buccinum globulosum*, Kiener: a variety of *Oliva patula*: a *Cytheræa* closely resembling or identical with *C. flexuosa*, and a fragment of a second species, probably *C. purpurascens*; *Potamomya labiata*; and fragments of oysters. There is, however, a species of *Macra* in very great numbers, with which Mr. Sowerby is wholly unacquainted. I may observe that I found recent shells of the first five species inhabiting the coast, a short distance to the southward. Some shelly limestone from the same place, which Sir Woodbine Parish had the kindness to show me, resembles that which I saw at Bajada, and in Banda Oriental. These beds, therefore, probably form parts of the Pampas deposit, and are not merely indicative of the period of its elevation. Nevertheless, on the opposite shores of the Plata, near the mouth of the Uruguay, I found lines of sand dunes, where the *Macra* and *Cytheræa flexuosa* were lying in such quantities on the bare surface, that the inhabitants, by merely sifting the sand, collect them for burning into lime.

After these facts we may feel certain, that at a period not very remote, a great bay occupied the area both of the Pampas and of the lower parts of Banda Oriental. Into this bay the rivers which are now united in the one great stream of the Plata, must formerly have carried down (as happens at the present day) the carcasses of the animals, inhabiting the surrounding countries; and their